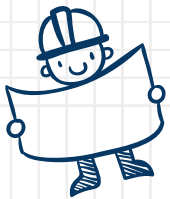
SCREW IT

Home Improvement

Sketching, Low-Fi, and User Testing



CMPSC 185 || Annika Damstedt, Hannah Zhang, Krystelle Baluyot

Meet the Team

Annika Damstedt

‘27

Computer Science

Hannah Zhang

‘27

Computer Science

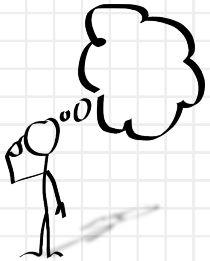
Krystelle Baluyot

‘27

Computer Science

SCREW IT

The Problem

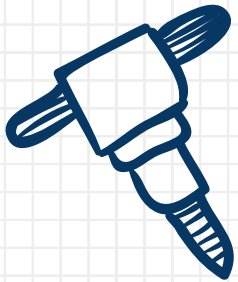


Renters and homeowners who are new to home maintenance often lack clear guidance on identifying household issues. This guidance is necessary to determining whether they can handle repairs themselves or whether they should hire a professional, as well as how to complete DIY repairs safely and find a reliable expert.

SCREW IT

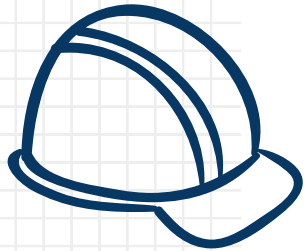
Our Solution

Use AI to identify home maintenance issues, compare DIY versus professional options based on cost, risk, and feasibility, and provide step-by-step guidance for completing the repair independently or choosing the right professional.

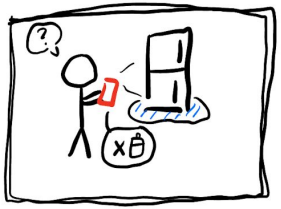


01

Solution Exploration

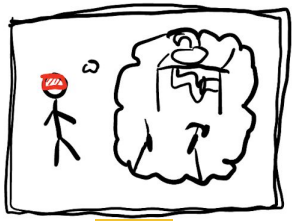


Brainstorming



Phone

AR glasses

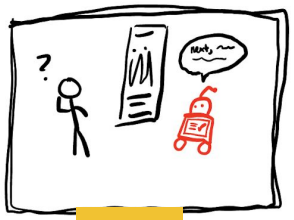


VR

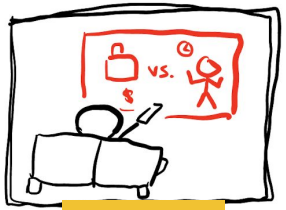
Social Media

AI Pin

Smart Watch

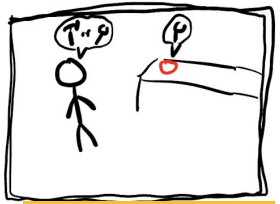


Robot

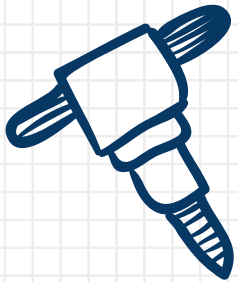


TV Channel

Tablet



Home control system (like Alexa)



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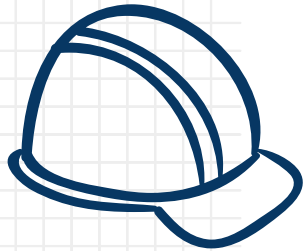
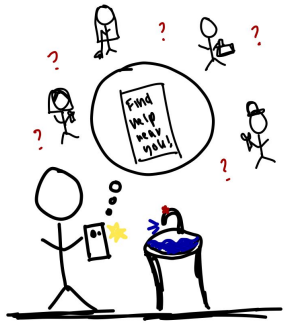
Concept Sketches



Phone

User uses phone to get detailed cost, time, and difficulty comparison between DIY and professional approaches



User uses phone to find reliable professional experts using AI assistant

User uses phone to take photo of issue, AI highlights area to focus on and provides detailed analysis

User uses phone to access step-by-step instructions for DIY approach using AI assistant.

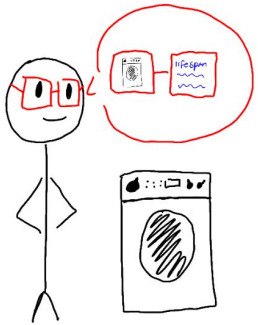
User uses phone to scan toolbox and detect different tools, tells user tools they already own for task to help them take action

AR Glasses

User uses AR glasses to scan and identify the maintenance issue

User uses AR glasses to get assistance and instructions to solve the issue

User uses AR glasses to scan broken parts and get a rough estimate on price



User uses AR glasses to identify appliances and their lifespan, and possible leading issues

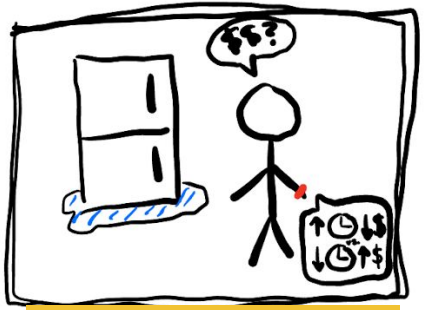
User uses AR glasses to compare diy and professional service price estimates

Smart Watch

Watch will list out supplies needed for a task and help you remember to pick them up

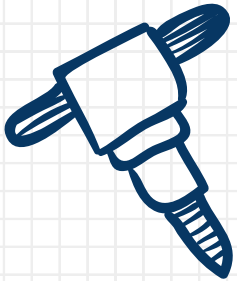
You can describe the problem to the watch and it will identify it

Watch will say steps out loud when you need them



You can ask for the cheapest way to solve a problem

Watch can recommend best professional in the area to call



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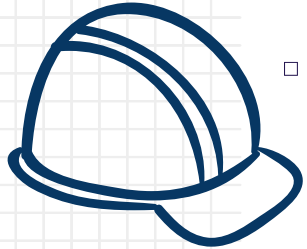
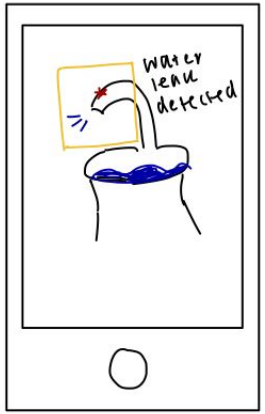


Key Screens

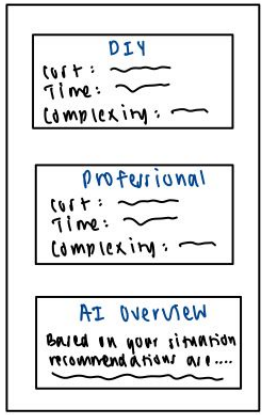
Phone

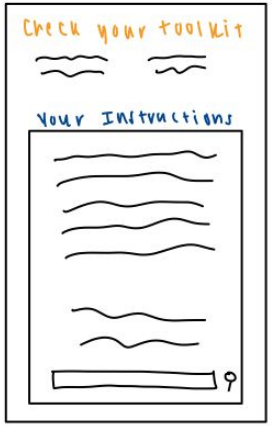
User logs onto app home page and selects “Tackle an Issue”



User is directed to camera to snap a photo of leaky faucet; AI detects issue with bounding box and gives detailed description of issue

AI then summarizes time, cost, and complexity factors for DIY vs. professional approaches

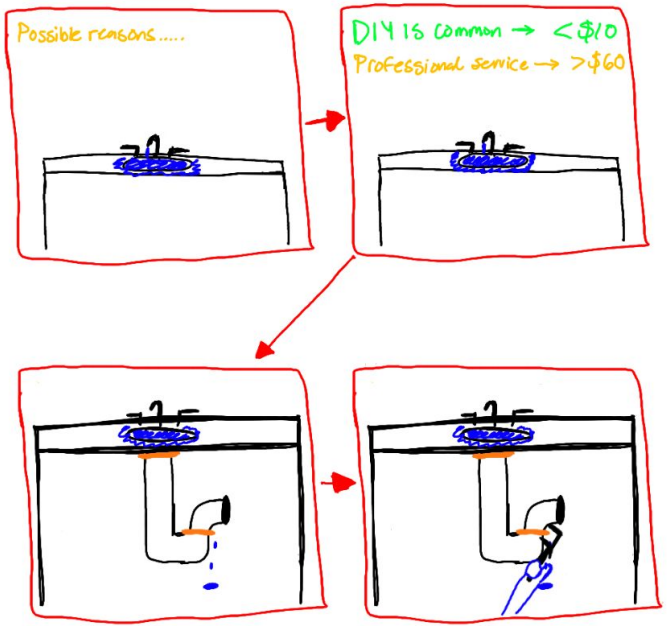




An instruction manual is provided with an AI assistant for the DIY approach

Glasses

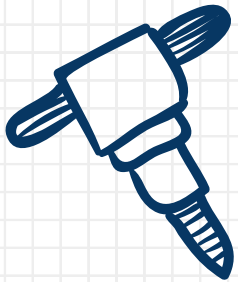
User asks, “Can you identify the issue” Glasses give list of possible reasons



Glasses give statistics on how common it is to DIY and the cost of both that method and professional services

Glasses identify the issue and gives estimated price for broken parts

Glasses give instructions and list of tools of how to fix issue



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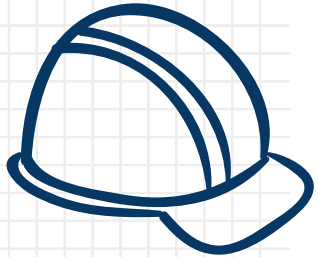


Making a Decision

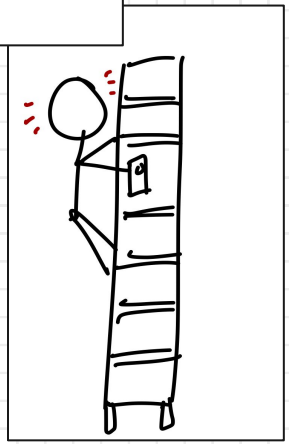
Phone

Pros:

- Most homeowners already own a phone
- No additional hardware required
- Built-in sensors (camera, microphone, GPS)
- Intuitive interaction (tapping, scrolling, etc)
- Portable

Cons:

- Small screen size
- If user's hands are occupied, phone is less/not accessible
- Using a phone while in a high-risk situation (e.g. standing on a ladder) can increase accidents
- Connectivity issues and battery drainage



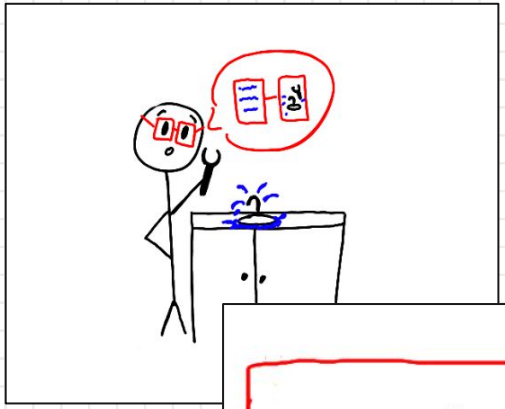
Glasses

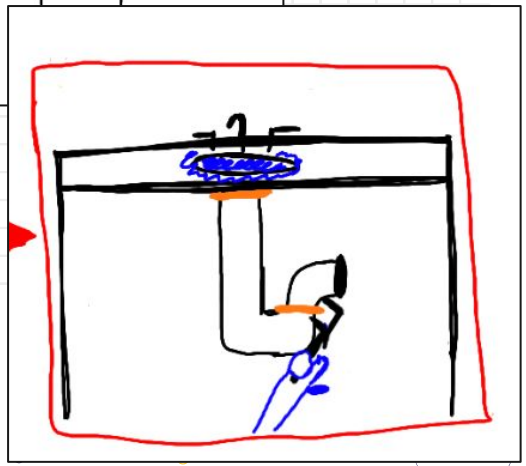
Pros:

- Hands free - easy to do tasks
- Voice activated
- Instructions are verbalized and showed on glasses lens
- Portable
- Fashionable

Cons:

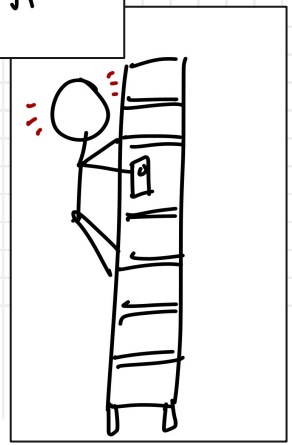
- Difficult to distinct maintenance issues if there's not clear view
- Not everyone has specific AR glasses
- Voice activation might lead to unclear instructions and commands
- Discomfort when wearing it too long - might get in the way of doing tasks





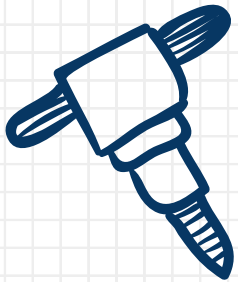
Our Decision

Phone!



Why?
Key values in deciding:

- **Convenience**
  - Most people already have a phone
- Portable
  - Easy to bring to where you're doing home maintenance
- Sensors
  - Has a lot of the sensors we need to scan issues, etc
- Can be hands free
  - Hands free options, although worse than other modalities



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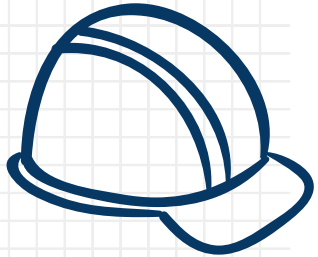


Task Flows

Simple, Moderate, Complex

Simple

The user can upload or take a picture to identify the maintenance issue

User engages with radial menu on home screen

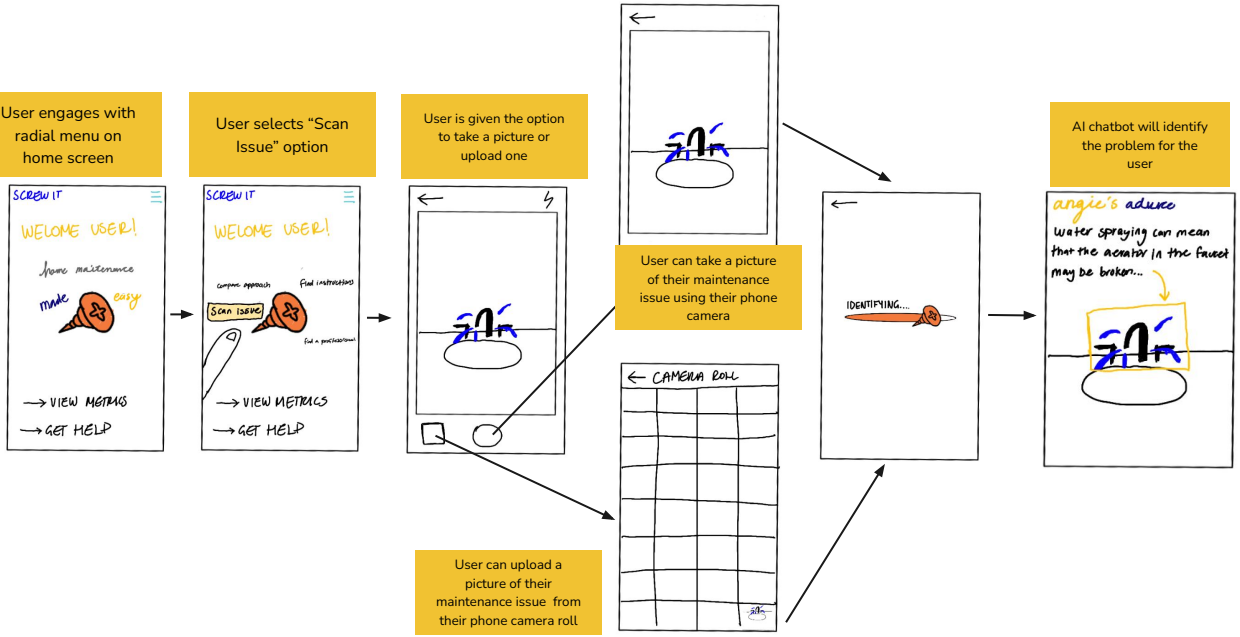
User selects “Scan Issue” option

User is given the option to take a picture or upload one

User can take a picture of their maintenance issue using their phone camera

User can upload a picture of their maintenance issue from their phone camera roll

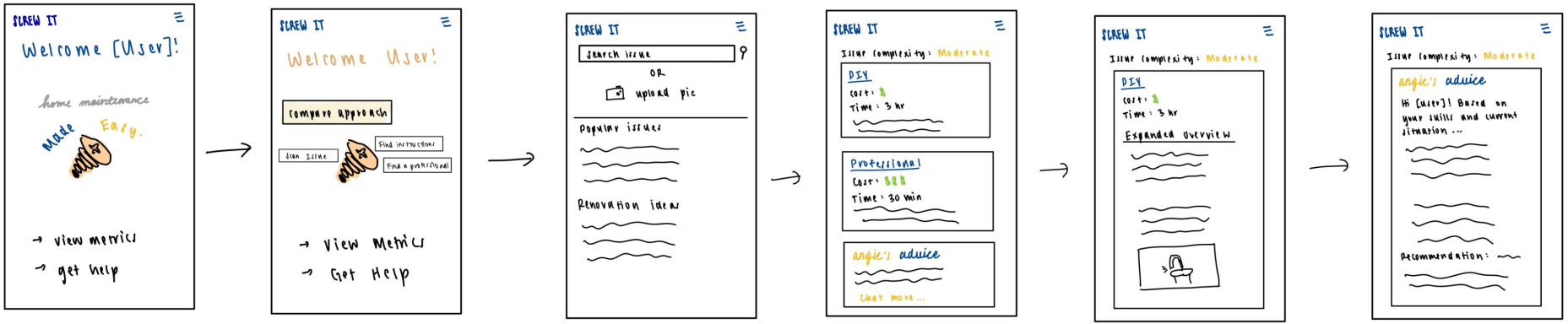
AI chatbot will identify the problem for the user



Moderate

The user can compare the DIY and professional solutions

User engages with radial menu on home screen	User selects “Compare approach” option	User searches for or uploads photo of issue	User is presented with DIY vs. professional comparison and AI summary chatbot	User clicks on DIY section for more information	User clicks on AI chatbot for summary + questions



Complex

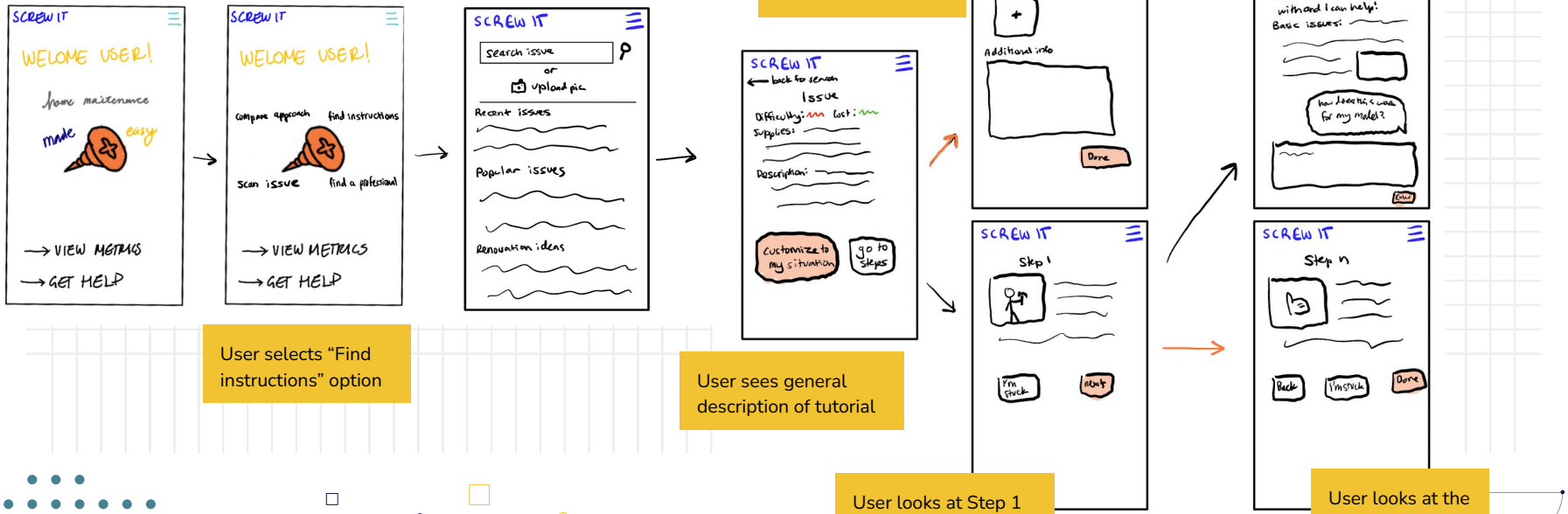
The user can learn how to fix the home maintenance issue

User engages with radial menu on home screen

User searches for or uploads photo of issue

User adds photos, description, to customize tutorial

User asks AI for help when stuck on a step

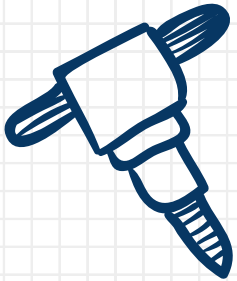


User selects “Find instructions” option

User sees general description of tutorial

User looks at Step 1

User looks at the last step



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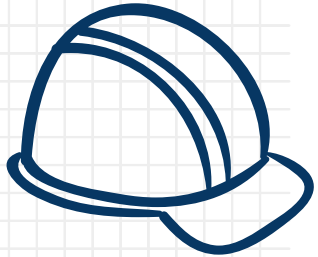


Low-Fi Paper Prototype

Construction

Design:

- Prototype designs drawn on IPad, with each member being in charge of drawing a different task flow
- Designs printed on paper and then cut out

Features:

- Home page that starts each of the task flows
  - All in the radial menu
- Branching paths within task flows

Function:

- Team member places the paper in response to user actions (or says out loud that the page is unavailable)

Participants

Y.Z.

Lives in an apartment, beginner in home maintenance

M.L.N.

Lives in a house, “bad” at home maintenance

L.S.

Homeowner, experienced in home maintenance

Demographics: our target population (renters, homeowners)
Recruitment: were asked to help us for 10 minutes with a school project, no compensation needed

Environment and Apparatus

TEST 1: Y.Z.

Location: Starbucks
Apparatus: paper prototype, phone camera

TEST 2: M.L.N

Location: Starbucks
Apparatus: paper prototype, phone camera

TEST 3: L.S.

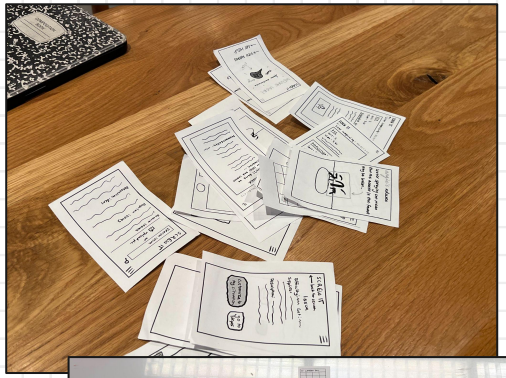
Location: Starbucks
Apparatus: paper prototype, phone camera

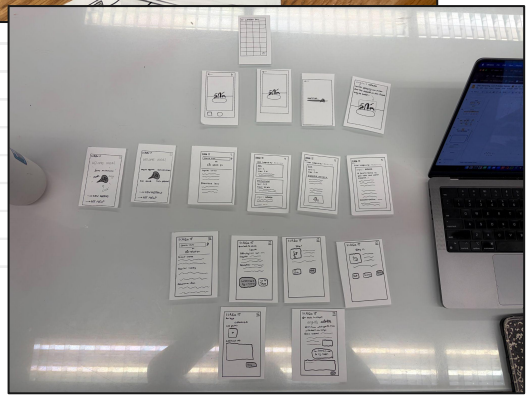
SETUP:

Facilitator across from participant

Notetaker off to the side

Computer at the side of the participant





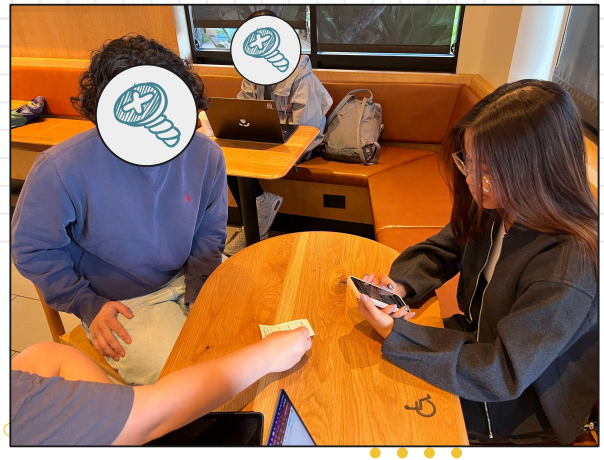
Procedure

FACILITATOR: Krystelle

1. Introduce our prototype and concept of Screw It!
2. Demonstrate how the prototype was going to work
3. Explain our tasks (simple, moderate, complex), and had the tester complete them one at a time.
4. Repeat any tasks that the user messed up on
5. Ask questions and feedback to improve the usability

NOTETAKER: Hannah

1. Record observations
2. Track misclicks
3. Note down testers' thoughts and feedback
4. Took pictures



COMPUTER: Annika

1. Replaced paper screens when tester presses
2. Inform when a feature wasn't applicable yet

Goals and Measurements

Intuitive Navigation

Navigation errors #

Is our app easy to navigate? Does it feel intuitive?

Perceived Helpfulness

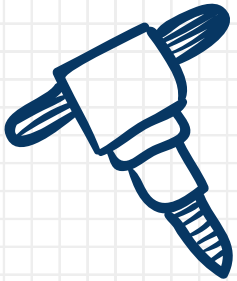
Rating of 1-5

Did our app feel like it helped you accomplish the task? Would you choose to use it for an actual problem in the future?

Would it help you learn?

Subjective

Did our app feel like it would help you grow your home maintenance skills?



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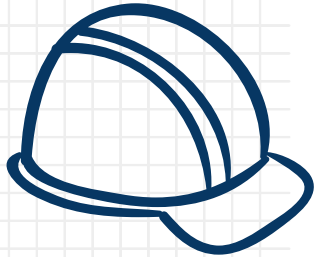


Results and Discussion

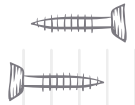
Metrics

	Navigation Errors #	Helpfulness 1-5	Would it help you learn?
Y.Z.	1	5	“Yes…”
M.L.N.	2	5	“Yes, it feels intuitive”
L.S.	1	5	“Yes, but I would rather watch a video to learn”

Critical Observations

- Not everyone found/used the chatbot we have (Angie's Advice)
- No one clicked customization tab (in complex task)
- Testers were more interested in professional services
    - While comparing DIY vs. Professional Services, our testers were more interested in how much time it was going to take rather than the price
- It wasn't clear what tab was best for what task

Generative Observations



- Everyone said they liked how simple the design was
- Navigating through wasn't difficult for them
  - There were no misclicks, they were just confused which tab they were supposed to use
- Everyone thought it would be helpful to them and help them learn
- Users who found the AI really appreciated it

Results

Intuitive Navigation

Partial success 

A couple major navigation errors, however when asked everyone said the navigation was intuitive.

Perceived Helpfulness

Success 

Everyone rated it a 5/5 for helpfulness.

Would it help you learn?

Partial success 

Everyone thought it would help them learn, but everyone also expressed interest in just finding a professional instead.

Findings

Not everyone found/used the chatbot we have (Angie's Advice)

→ We need to make it more explicit that it can be used as a learning assistant and have it's only personal tab in the main menu.

No one clicked customization tab (in complex task)

→ We need to make buttons clearer and its intended use more direct.

Testers were more interested in professional services

→ We need to implement recommending professional services as soon as possible

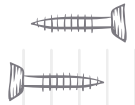
It wasn't clear what tab was best for what task

→ We need to refine the names of each tab and possibly add a tutorial

Changes

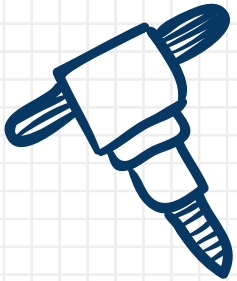
- Include video tutorials with the addition of written steps
- Include AR and AI assistance with DIY method to ensure that users are doing the steps correctly
- Add more flow between tasks (e.g. “Scan Issue” -> Compare approaches” instead of going back to main menu)
- Add a “professional services” tab that allows users to see ratings of connect with professional services nearby

Shortcomings



- Couldn’t test actually helping someone with a problem (had to imagine)
- Couldn’t test professional services tab
- Couldn’t test following instructions while fixing an issue
- Couldn’t test on real, accurate instructions

Thank you!



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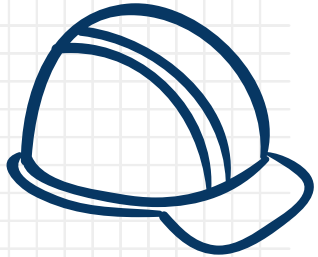
Appendix



Aggregated Critical Incidents

Task	Description of Event	Type	Severity	Explanation/ Incident
General	One user confused about why to use app	Negative	3	“Why can’t I just call my landlord?”
Navigation	One user accidentally did the complex task instead of the simple task	Negative	5	Were confused about how to use our app and missed scan issue feature
General	One user non native English speaker, but could still navigate	Positive	1	App intuitive enough for language not to be very impactful
Navigation	One user chose to do the complex task when asked to do the moderate task	Negative	3	Wanted to just get to solving the problem when the option was presented

Aggregated Critical Incidents

Task	Description of Event	Type	Severity	Explanation/ Incident
Navigation	Multiple users tried to find a professional instead of doing the task	Negative	2	We should implement finding a professional as soon as possible since it is a promised feature
Design	One user mentioned feeling overwhelmed by the amount of information shown at once	Negative	2	We should make sure to split information into bite sized, comprehensional chunks
Navigation	One user got very confused on where to go to complete the task	Negative	5	“Do I just click it?” “I’m a little stuck”
Navigation	One user liked the radial menu	Positive	3	Liked how there were a few, clear options instead of a “convoluted menu”

Aggregated Critical Incidents

Task	Description of Event	Type	Severity	Explanation/ Incident
General	One user didn't know what "DIY" meant	Negative	3	DIY is not a universally known acronym
General	One user mentioned text instructions being not useful and would rather watch a video tutorial	Negative	4	Text instructions are particularly difficult to follow for home maintenance
General	One user really appreciated the scan issue feature	Positive	4	"90% of the problem is knowing what the problem is"
General	One user mentioned wanting to just use Yelp for professional	Negative	2	Yelp's features for comparing professional options useful but untrustworthy

Testing Script

“Welcome! We’re prototyping an app called ScrewIt. This app will help you identify home maintenance issues, compare DIY and professional solutions to choose what is right for you, and guide you through the steps needed for a DIY solution or a professional solution.”
“First, I’ll demonstrate a way to use the app so you can get a feel for what we want you to say.”
“Ok, I’m looking at the home screen, and I see the logo in the center, so I’m gonna tap that. Now I’m seeing a variety of options. I’m gonna click on “compare approach” because that sounds interesting. Ok, I’m just gonna click on one of the popular options listed and see what that does. This issue isn’t interesting, so I’m gonna click the arrow to try and go back. Now I’m done, so I’m gonna click the name in the upper left corner to try and go back to the home page.”
“That was a demonstration of what we are looking for. Just be sure to say your thought process out loud, good or bad. Now, we’re gonna give you a task. You will try and complete the task, and whenever you feel you are finished you will navigate back to the home page, where we will give you a different task. Are you ready to start?”
“Imagine your sink has started spraying water everywhere. Use the app to identify what the issue is.”
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If the user navigates to an inaccessible page, say “That page is under construction, try something else”
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“Great. Here is your next task. You want to compare the best ways to solve the issue of your sink spraying water everywhere.”
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“Last one. Now you want to follow a tutorial to solve the issue of your sink spraying water everywhere.”
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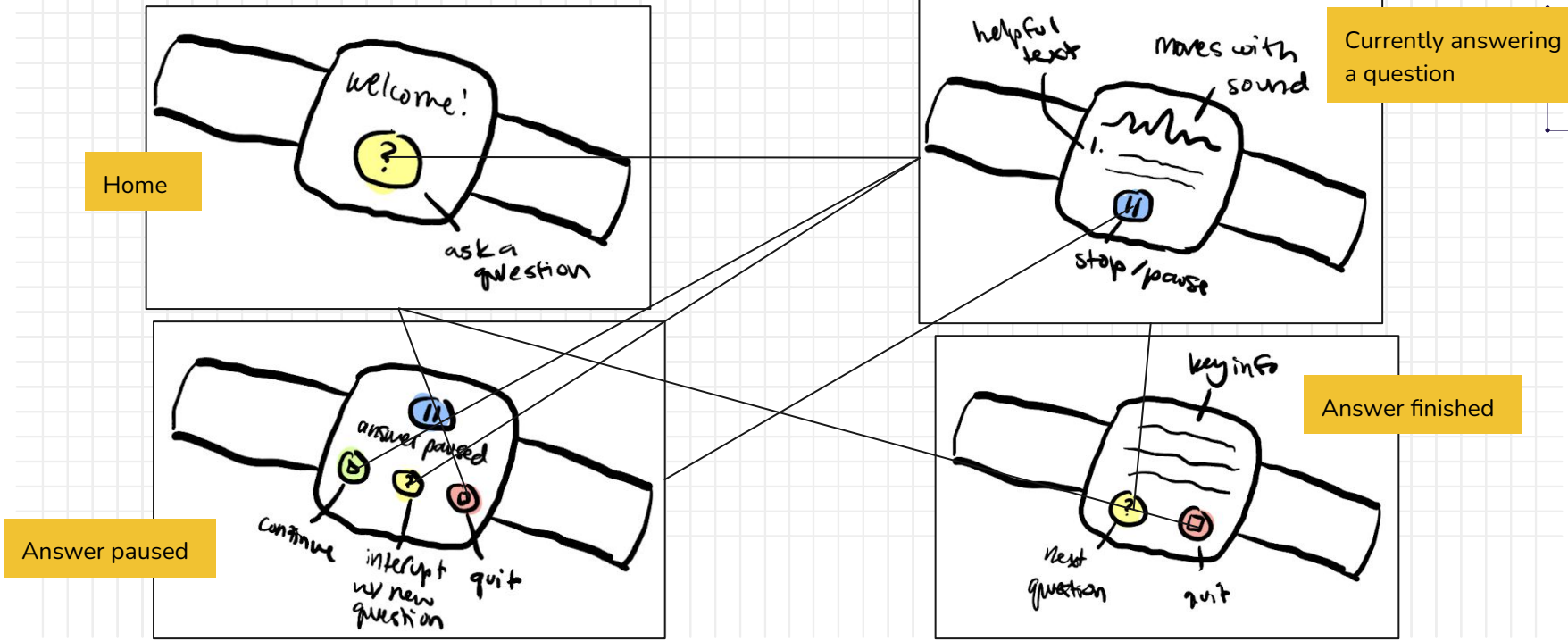
“Great job. Thanks for completing the tasks. Now we just have a couple questions for you.”
“Which task did you find the hardest?”
“Did you feel like the app would help you if your sink actually broke? Rate its effectiveness on a scale of 1-5”
“Did you feel like the app would help you learn home maintenance skills? Rate its effectiveness on a scale of 1-5”
“Do you have any final thoughts or observations you can share?”
“Did the UI feel intuitive? What parts did you like about it? What didn’t you like? Explain.”

Smart Watch Key Screens



Smart Watch Pros & Cons

Pros:

- Great for verbally asking questions
- Hands free for help when doing tasks
- Very portable
- Fashionable
- Reduces phone usage

Cons:

- Not easy to look over information comparisons
- No memory of past conversations
- Not everyone has a smart watch
- No image visuals for tutorials
- Only works for verbal questions